

CLAIMS

1. A keypad for a portable electronic device, comprising:

- a number of pressable keys,
- associated with each key, switching means for realizing a switching function as a response to the key being pressed and
- illumination means for illuminating at least a part of the keypad;

wherein:

- the illumination means comprise light sources that are semiconductor light-emitting devices made of layered foil structures,
- at least one of said light sources is located in the immediate vicinity of the switching means associated with at least one key,
- said light sources constitute at least a first group of light sources and a second group of light sources and
- said first and second groups of light sources are arranged to be illuminated separately from each other.

2. A keypad according to claim 1, wherein said light sources are organic light-emitting diodes.

3. A keypad according to claim 2, wherein:

- the keypad comprises a printed circuit board so that the switching means comprise conductive patterns close to each other on a surface of said printed circuit board, and
- said printed circuit board constitutes a supporting substrate layer for the organic light-emitting diodes.

4. A keypad according to claim 1, comprising:

- in respect of each key, a pair of conductive patterns close to each other which together form a key location,

- a number of resistive strip sections that link conductive patterns from a number of key locations into a resistive chain having a first end and a second end, and

- a number of light sources, each of which is coupled to the second end of said resistive chain so that the second end of said resistive chain functions as a common coupling point to said light sources.

5 5. A keypad according to claim 4, comprising as many illumination controlling lines as there are light sources coupled to the second end of said resistive chain, each illumination controlling line being coupled to a light source of its own, so that each of said light sources is individually controllable.

10 6. A keypad according to claim 5, wherein said illumination controlling lines are input voltage lines to the light sources.

15 7. A keypad according to claim 5, comprising as many switches as there are light sources coupled to the second end of said resistive chain, so that each of said switches is coupled to a light source of its own, and said illumination controlling lines are control voltage lines to the switches.

8. A keypad according to claim 5, comprising a converter for converting illumination commands into controlling signals on said illumination controlling lines.

20 9. A keypad according to claim 8, wherein said controller is a serial to parallel controller for converting serially conveyed illumination commands into controlling signals on said illumination controlling lines.

25 10. A keypad according to claim 8, wherein said controller is coupled to a sequence memory and arranged to respond to a certain illumination command by writing a sequence of controlling signals read from said sequence memory onto said illumination controlling lines.

11. A keypad according to claim 1, wherein the illumination means comprise a light source in the immediate vicinity of the switching means associated with each key.

30 12. A keypad according to claim 1, comprising, in the following order, the following essentially parallel layers:

- a mechanical support structure,

- a dome layer comprising a bulging, elastically deformable conductive dome in respect of each key, the bulging direction of said dome being towards said mechanical support structure,

5 - a printed circuit board so that the switching means comprise conductive patterns close to each other on that surface of said printed circuit board which is towards said dome layer, and

- a key layer comprising a visible and touchable surface in respect of each key;

wherein said light sources are located between said printed circuit board and said key layer.

10 13. A keypad according to claim 12, comprising a perforated insulation layer between said dome layer and said printed circuit board, and an outer cover on a distant side of said key layer.

14. A keypad according to claim 12, wherein said light sources are organic light-emitting diodes placed immediately beneath the visible surfaces of the keys.

15 15. A keypad according to claim 12, comprising a light guide between said printed circuit board and said key layer.

16. A method for illuminating the keys of a keypad, comprising the steps of:

- providing light sources that are semiconductor light-emitting devices made of layered foil structures as illumination means, and

20 - producing, with at least one of said light sources, an illuminating effect where at least one key is illuminated differently than certain other keys in the keypad.

13 m 14 17. A method according to claim 16, comprising the steps of:

8-265413 - detecting a call connection request indicating the intention of a caller to establish a communication connection with the device controlled through said keypad,

25 - identifying the caller and associating the identified caller with a certain illumination function and

- producing, with at least one of said light sources, an illuminating effect representing said illumination function.

18. A method according to claim 16, comprising the steps of:

- entering a specific mode where at least one key is more preferable as the key to be pressed next than the other keys in the keypad,
- selecting at least one key which in said specific mode is more preferable as the key to be pressed next than the other keys in the keypad, and
- producing, with the light source or light sources associated with the selected key or keys, an illuminating effect which emphasizes the preferability of the selected key or keys over the other keys in the keypad.

19. A method according to claim 16, comprising the steps of:

- entering a game mode and allowing the user of the device controlled through the keypad to play a game with the device,
- detecting the occurrence of a game event which has previously been associated with an illuminating effect and
- generating said illuminating effect with at least one of said light sources.

20. A method according to claim 16, comprising the steps of:

- entering a game mode, and
- generating, with said light sources, an effect of sequentially illuminating selected ones of the keys in the keypad in order to prompt the user to press the illuminated keys in the same order in which they were illuminated.

add 7
a1
add 1
p1